

UTAH Conservation SHOWCASE



Innovative Farmer Saves Energy

Roger Barton, like other farmers in the West, must irrigate the alfalfa hay he raises for horse owners. Since his small Emery County Utah farm does not provide enough income for the entire family, he has to work elsewhere and he has to think of ways to keep his farm costs down.

Roger likes to think of new ideas. A few of years ago when diesel costs rose to \$4.25 per gallon, he had to think of a new way to power his center pivot irrigation system, which creates those round circles you see as you fly over much of America's farmland. The center pivot also saves lots of water by spreading just the right amount more evenly over the land.

With the help of a Conservation Innovation Grant from USDA's Natural Resources Conservation Service (NRCS), Roger worked with a pump company and NRCS engineers to design a hydro turbine system that generates electricity to power his pivot irrigation system.

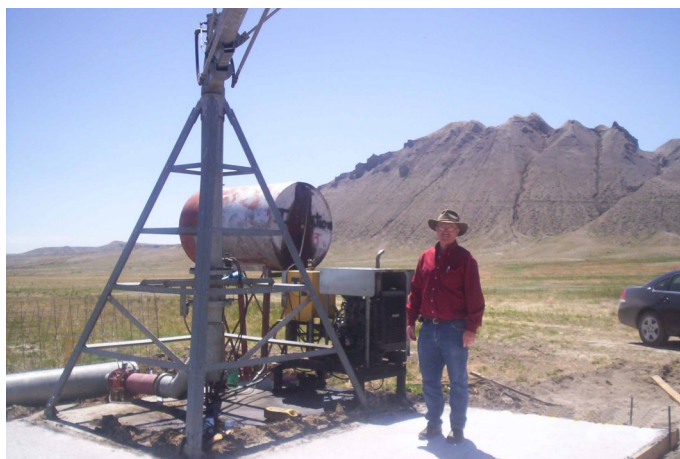
Irrigation water in his area is delivered from the mountains in a pressurized pipe at about 85 pounds per square inch (psi)—about twice as much as needed. In the past, this caused some damage to his sprinkler heads.

Now, when the water enters his new system it travels through the vanes of the turbine (see fig. 1) causing the turbine to spin and turn a hydraulic pump that pumps hydraulic fluid through gears that turn the wheels, moving the long irrigation boom around the circle. The water pressure is reduced to about 45 psi, just the right amount to keep it from damaging the sprinkler heads.

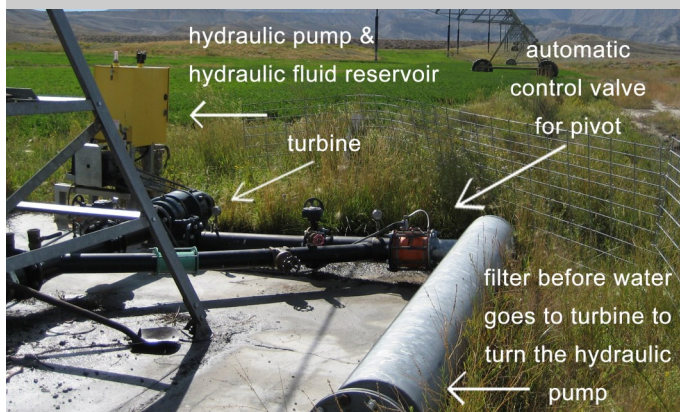
Benefits of New System

"This new system is terrific," says Roger. "It not only did away with a \$3,500 annual fuel bill, but it eliminates emissions from the old motor, avoids storing fuel on the farm, and lessens our dependence on foreign sources of oil. I'd say that's a win-win for everybody."

Roger has since



Roger Barton changed this old, diesel-style irrigation pump to a new, more energy efficient hydro-generated pivot pump, shown in the diagram below.



shared information about his system with neighbors and his ideas, developed with the USDA grant, have been adopted into the NRCS standard practices list approved for use on other farms participating in the Farm Bill Environmental Quality Incentives Program (EQIP). NRCS State Engineer Bronson Smart estimates the annual operating cost of the new turbine system to be less than \$100.